

Redfish

JANUARY, 2012 (ISSUE #7)



PUFFERS, PORCUPINES, BOX & COWFISH
IT'S HIP TO BE SQUARE

TROPICAL



Genus *Hyphessobrycon* explored

PLANTED



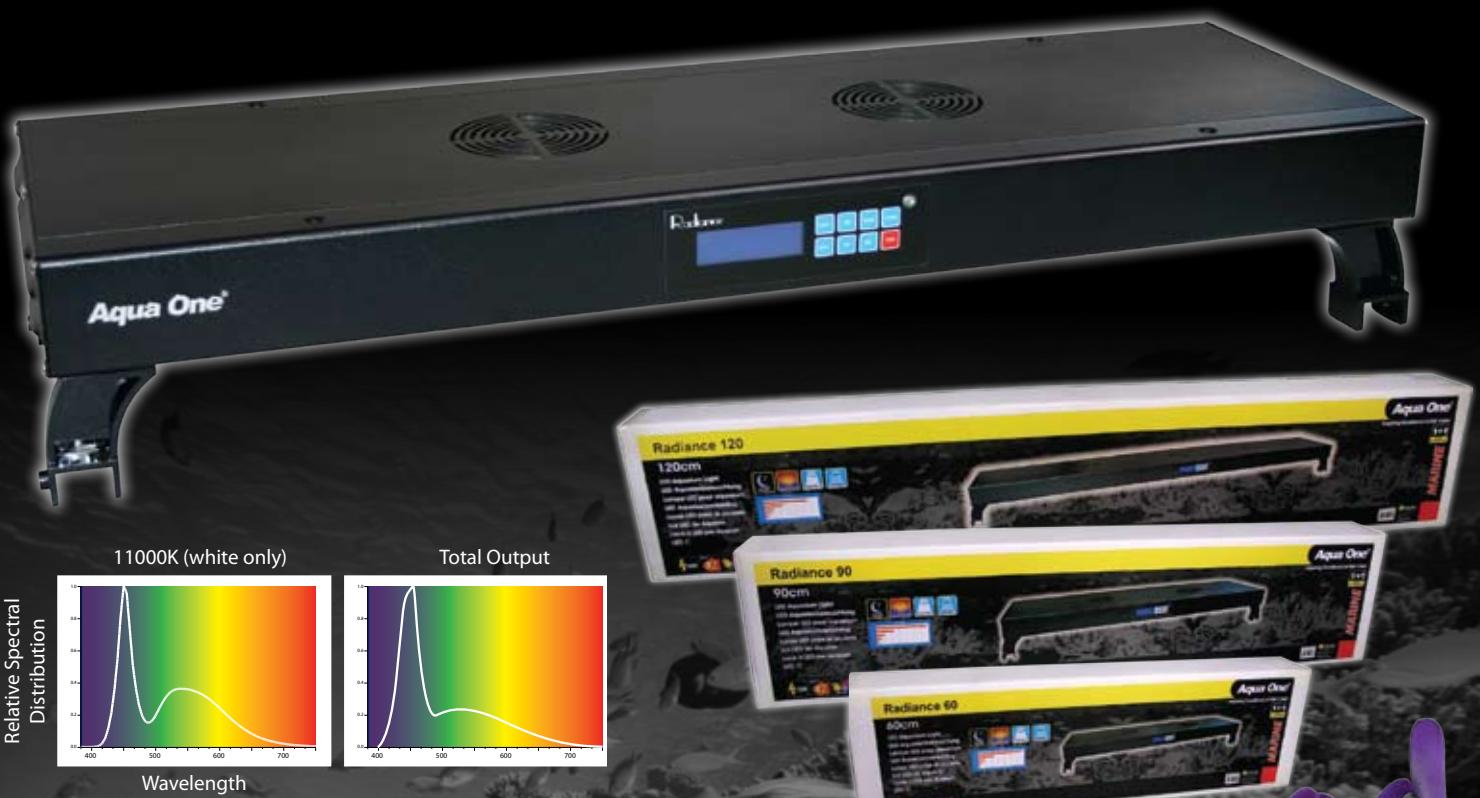
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This month's Eye Candy Contents Page Photos courtesy:

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'Adventure Aquarium Marine Tropical Fish' by Jim Capaldi
'Angry Fish' by Michael Bentley
'Bright Yellow Fish' by Michael Bentley
'a fleet of yellow fish' by Yinghai

(Bottom row. Left to Right)
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General Advice Warning

The advice contained in this publication is general in nature and has been prepared without understanding your personal situation, experience, setup, livestock and/or environmental conditions.

This general advice is not a substitute for, or equivalent of, advice from a professional aquarist, aquarium retailer or veterinarian.

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About Redfish

Redfish is a free-to-read magazine for fishkeeping enthusiasts.

At Redfish we believe in the free exchange of information to facilitate success by aquarium and pond hobbyists. Each month Redfish Magazine will bring you dedicated sections on tropical, coldwater, marine and ponds.

Redfish was founded in early 2011 by Jessica Drake, Nicole Sawyer, Julian Corlet and David Midgley.

We hope you enjoy this, the seventh issue of Redfish.

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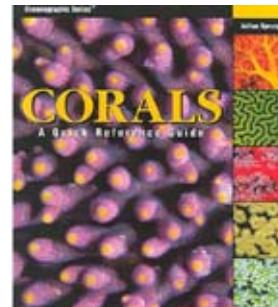
REDFISH MAGAZINE PHOTO CONTEST. OCT 2011 - JAN 2012

**EXTENDED 1 MONTH DUE TO THE
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Redfish Magazine is pleased to announce the second of its quarterly Aquarium Photo Contests for 2011-2012. Each month we'll publish our favourite reader submitted photos, and in February 2012, we'll announce the winners for this round.

The theme this quarter is:
“My fish and I”

This quarter we are pleased to be able to offer Julian Sprung's excellent book: *Corals: A Quick Reference Guide* as a prize!



CODEWORD: PUFFER



ENTERING THE PHOTO CONTEST

Entering the photo contest is simple.

Email your name, the codeword, postal address and a high res. version of your photo to competitions@redfishmagazine.com.au.

Please check the rules and regulations prior to entry.

“Waiting for Separation” by Hamid Najafi.



RULES AND REGULATIONS

Photo must be your own work. Post processing of your own images is allowed. You must be over 18 years of age to enter the competition.

Detailed rules and regulations are available at:

www.redfishmagazine.com.au/competitions/2011_photo_comp_1

“Untitled” by D. Sharon Pruitt.

NEED INSPIRATION?

Here are some amazing aquatic images from flickr!



“Diver Silhouette” by Tim Sheerman-Chase



“Untitled” by Philippe AMIOT



“ray” by Jim Fischer



“The Dolphin Gives Girl a Rose - With Love ;)”
by Hamed Saber

HYPHESOBRYCON

HARD TO SAY, BUT A PLEASURE TO KEEP

BY PIP COURT

Hyphessobrycon are shoaling, peaceful fish that can't compete with boisterous or much larger tank mates. Keep these fishes with other other small tetras, Pencilfish, Dwarf Cichlids, Corydoras or Otocinclus.



Lemon tetra. Photo: Wikimedia Commons User:Waugberg

NATURAL HABITAT

Hyphessobrycon is a large genus of freshwater fish belonging to the family Characidae. These species are among the fishes commonly known as tetras. There are over 120 valid species in this genus, which are native to the neotropic ecozone in South America, however, can be found from Mexico to Argentina. *Hyphessobrycon* tetras tend to inhabit quiet tributaries off the main river channels, backwaters, and oxbow lakes. They often gather under the cover of



Hyphessobrycon species are widespread in the Amazon region.

overhanging or marginal vegetation.

TAXONOMY

With no phylogenetic analysis of this genus, species are placed into this genus as anatomically defined by Carl H. Eigenmann in 1917. By this definition *Hyphessobrycon* is identified by the presence of an adipose fin, an incomplete lateral line, a two tooth series in the premaxilla, preventral scales arranged in more than one row, and lack of scales in the caudal fin. The name *Hyphessobrycon* is of slightly uncertain origin, the second part derived from a Greek word meaning “to bite”, the first derives from a Greek word meaning “slightly smaller”

COLOURATION, SIZE AND DIMORPHISM

All small fishes, the *Hyphessobrycon* tetras reach maximum lengths of 2-7cm, depending on species. There is also great anatomical diversity, they are generally of typical characin shape, but vary greatly in colour and body form. Many species have distinctive black, red, or yellow markings on their bodies or fins. It is this diversity in variety and colour that makes *Hyphessobrycon* such popular aquarium fish. Sexual dimorphism is not immediately apparent for most species however upon closer inspection males will usually exhibit more intense colouration with longer finnage, while females often exhibit a more rotund body shape, particularly when gravid.

DIET

Hyphessobrycon are generally omnivorous, feeding predominately on small crustaceans, insects, worms and zooplankton. In the aquarium, they are not fussy eaters, relishing any frozen and live foods offered such as bloodworms, black worms and brine shrimp. They also readily accept most high quality commercial flakes and pellets.

COMPATIBILITY

Species within this genus are shoaling, peaceful fish and in general won't be able to compete well with boisterous or much larger tank mates. Ideally keep these fishes with other quiet South Americans, such as other small tetras, pencil fish, *Aristogramma* dwarf cichlids, *Corydoras* and *Otocinclus*.

REPRODUCTION

To breed *Hyphessobrycon* spp. you'll need to set up a separate tank if you want to raise decent numbers of fry. Something around 18" x 10" x 10" in size is fine. The aquarium should be very dimly lit and contain clumps of fine-leaved plants such as java moss or



Neutral to acidic water in densely planted tanks make ideal housing for *Hyphessobrycon* tetras.



The Red Phantom Tetra, *Hyphessobrycon sweglesi*, is a spectacular coloured species from the genus.



Corydoras make ideal tank mates. These peaceful bottom dwellers co-exist amiably with *Hyphessobrycon* spp.



Looking for something more challenging, cichlids from the genus *Apistogramma* are great tank mates but can be demanding to keep for non-experts.



Flooded forests, called Igapo, are home to many species of Amazonian Tetras including fishes from the genus *Hyphessobrycon*. This is a tributary of the Rio Negro in Brazil, here Bleeding Heart Tetras (*Hyphessobrycon erythrostigma*), and other species of *Hyphessobrycon* can be found. The water is acidic and soft, darkly stained with tanins from the vegetation.

spawning mops, to give the fish somewhere to deposit their eggs. Alternatively, you could cover the base of the tank with some kind of mesh. This should be of a large enough grade so that the eggs can fall through it, but small enough so that the adults cannot reach them. The water should be soft and acidic in the range pH 5.5-6.5, gH 1-5, with a temperature of around 26-28°C/79-82°C. Filtering the water through peat is useful, as is the use of RO water. A small air-powered sponge filter bubbling away very gently is all that is needed in terms of filtration.

It can be spawned in a group, with half a dozen specimens of each sex being a good number. Condition these with plenty of small live foods and spawning should not present too many problems.

Alternatively, they can be spawned in pairs. Using this technique, the fish are conditioned in male and female groups in separate tanks. When the females are noticeably full of eggs and the males are displaying their best colours, select the fattest female and best-coloured male and transfer them to the spawning tank in the evening. They should spawn the following morning.

In either situation, the adults will eat the eggs given the chance and should be removed as soon as eggs are noticed. These will hatch in 24-36 hours, with the fry becoming free swimming 3-4 days later. They should be fed on an infusoria-type food for the first few days, until they are large enough to accept micro worms or baby brine shrimp (nauplii). The eggs and fry are light sensitive in the early stages of life and the tank should be kept in darkness if possible.

The majority of these fish supplied to the trade are still wild caught. Thankfully none of the roughly one hundred fishes in the genus appear on the IUNC Red List of threatened species. Collectors throughout South America over the last decade have begun implementing more sustainable catch and export methods in line with greater regulation from South American governments, particularly Brasil. It is also noteworthy that Aquaculture in these species throughout South East Asia is also producing significant numbers of the more popular species for the ornamental aquarium market.

Some of My Favourite Species

EMBER TETRA *HYPHESSOBRYCON AMANDAE*

This attractive little fish was only first discovered in 1986 in the Araguaia River basin in the Mato Grosso, Brazil. It is an exceptionally small species who's body is almost translucent while being bright orange/red in colour, with fins that are mostly clear with some red colouring. There is no colour difference between the sexes, but mature females will appear more plump and rounded in the belly area than males.

The Ember tetra will do best in soft water with a pH under 7.0, it is the perfect little fish for the planted nano aquarium.

RED BLUE COLUMBIAN TETRA *H. COLUMBIANUS*

A beautiful, albeit robust choice for the 'general' community tank, where it will add a dash of colour. This species can reach a maximum size of 7cm and sedate species such as anabantoids or dwarf cichlids can be intimidated by its somewhat boisterous nature, so it's best kept with active tankmates. Other similarly-sized tetras, rainbowfish, larger rasboras, barbs and most danios make excellent choices.

Although it has a reputation as a bit of a fin nipper, this behaviour can usually be rectified by keeping it in a small shoal of at least 6-8 specimens. When maintained in these kind of numbers any squabbling is generally contained within the group.

Mature males develop a slightly elongated dorsal fin, and are usually slimmer than females. Feeds chiefly on small invertebrates in nature. In the aquarium, it proves unfussy. Feed a mixture of dried flakes and granules along with small live and frozen foods.



The Ember Tetra was first discovered in Mato Grosso, Brazil. It's a small species ideal for the nano aquarium.

Photo by Budi Lukman

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The beautifully coloured Red Blue Columbian Tetra has a bit of a reputation for fin nipping. It's best keep in a large school to avoid the worst of this behaviour.



The Ornate Tetra has everything you could want in a community species: small, peaceful and beautiful!
Photo by Budi Lukman.

This species was only officially described in 2002, although for several years previous it was incorrectly referred to as *H. ecuadorensis*. Apparently this mis-identification was down to a superficial resemblance between the two species that was noticed when *Hyphessobrycon columbianus* was first collected.

ORNATE TETRA (SANTA CLAUS TETRA) *HYPHESOBRYCON BENTOSI* (ORNATUS)

This is a very peaceful species, reaching only 4cm, that won't compete well with very boisterous or much larger tankmates. Ideally, keep it with other South American species, such as other *Hyphessobrycon* or *Hemigrammus* species, pencil fish, *Aristogramma* dwarf cichlids, *Corydoras* and small loricariids. In a more general community, it can be combined with smaller rasboras, barbs, Anabantoids and West African dwarf cichlids such as *Pelvicachromis* species. Due to its shape it's safe to be kept with larger cichlids such as angel fish or discus as well.

Always buy a group of at least 6 of these, preferably 10 or more. It's a shoaling species by nature, and will



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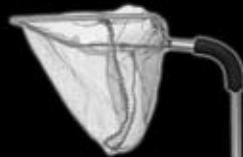
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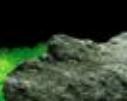
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fare much better when in the company of its own kind. Like most tetras, it actually looks far more effective when maintained like this anyway. You'll also see some stunning displays of fin flaring by rival males if several are present.

Males develop extended dorsal and anal fins as they mature. They also tend to be larger, slimmer and a bit more colourful than females.

Prefers soft, slightly acidic water in the range 5.5-7.0, with a temperature ranging from 24-28°C/75-82°F. The species feeds chiefly on small invertebrates in nature. In the aquarium, it proves unfussy. Feed a mixture of dried flakes and granules along with small live and frozen foods.

ROSY TETRA

HYPHESOBRYCON ROSACEUS

Another very peaceful species that won't compete well with very boisterous or much larger tankmates. The Rosy Tetra will only reach 4cm and should ideally only be kept with other South American species, in a fashion similar to the Ornate Tetra.



The Red Tetra is commonly found in slow moving waters like this stream in the Suriname River Basin.



Rosy Tetras (*Hypessobrycon rosaceus*) are very similar to the Ornate Tetra and is closely related.
Photo by Budi Lukman.

Males develop extended dorsal and anal fins as they mature. They also tend to be larger, slimmer and a bit more colourful than females. As with all *Hyphessobrycon*, always buy a group of at least 6 of these, preferably 10 or more.

Although it will survive in slightly alkaline water, it tends to be more colourful when kept in acidic conditions with a pH between 5.5-7.5, a general hardness of 1-12 and a temperature of 24-28°C/75-82°F.

BLACK NEON TETRA

HYPHESSOBRYCON HERBERTAXELRODI

One of the best tetras for the 'general' community setup. It is lively, peaceful and its colours offer a pleasing contrast to those of many other species. It's a good tankmate for most commonly available livebearers, danios, rasboras, other tetras and peaceful bottom dwellers such as *Corydoras* or smaller loricariids. It can also be kept with the majority of commonly available gouramis and dwarf cichlids. Obviously, it isn't safe with larger species that may see it as food.

Always buy a group of at least 6 of these, preferably 10 or more. It is a shoaling species by nature, and will fare much better when in the company of its own kind. It actually looks far more effective when maintained like this.

Mature females are more rounded in the belly than males, and tend to grow a little larger, both sexes can reach a size of 4cm. The black neon tetra will tolerate pH of 5.5-7.5 although it tends to be more colourful when kept in acidic conditions, with a temperature of 23-38°C/73-100°F and a general hardness of 2-15.

This species is ubiquitous in most dealers' tanks and is one of the best choices for the newcomer to fish-keeping, being both hardy and inexpensive. It's been deservedly popular in the hobby for several decades. Despite the common name, it's not a particularly close relative of the neon tetra, which belongs to the genus *Paracheirodon*.

BLACK PHANTOM TETRA

HYPHESSOBRYCON MEGALOPTERUS

Another star performer in the 'general' community setup. It is lively, peaceful and its colours offer a pleasing contrast to those of many other species. It's a good



While more subtly coloured, the striking pattern on the body of the Black Neon Tetra makes the species a good choice for keeping in large groups where the pattern is showed off to best effect.

tankmate for most commonly available livebearers, danionins, rasboras, other tetras and peaceful bottom dwellers such as *Corydoras* or smaller Loricariids. It can also be kept with the majority of commonly available gouramis and dwarf cichlids. Obviously, it isn't safe with larger species that may see it as food.

Males develop a pointed, extended dorsal fin as they mature. In comparison, the dorsal fin of females is shorter and they possess red/orange edges to the adipose, ventral and anal fins. Females also tend to have a somewhat stockier profile than males.

Easy to feed. It will readily accept just about anything offered. For the best condition and colours, offer regular meals of small live and frozen foods such as bloodworm, Daphnia and brine shrimp, along with dried flakes and granules.



Like the Black Neon, the Black Phantom's attractiveness is enhanced when a school is maintained. Larger groups not only look better but are healthier and less stressed.

A hardy species that will thrive in an aquarium with a pH of 6.0-7.5, with a general hardness of 2-20°GH. Somewhere towards the lower end of this range is best, as the fish tend to lose colour in hard water, and a temperature range of 22-28°C/72-82°F.

SERPAE TETRA *HYPHESOBRYCON EQUES*

The shade of red varies on this species of fish from different geographical regions. The dorsal is edged in white. This species is readily discerned from all the other rosy tetra species by the dark colour pattern on the posterior part of the anal fin. Weitzman & Palmer (1997) note that this dark pattern is somewhat variable on wild-caught specimens from different locations.

Many of the fish now available in the hobby are commercially raised and differ from wild-caught fish with respect to the dark shoulder or humeral patch. Commercially bred fish are descended from hybrids (perhaps unintentionally) of fish from different geographical areas, and the patch is shorter or all but absent on most; on wild-caught fish, this patch is black, elongated and triangular.

gate and slightly triangular.

This species behaviour can be unpredictable, sometimes peaceful, but known to be aggressive and a fin nipper. Must be kept in a group, minimum 6 but 8+ is more likely to help curb the fish's aggressive (fin-nipping) tendencies. Serpae Tetras shouldn't be kept with slow or long-fin fish (guppies, angels, discus, gourami, betta) and only with active species.

The Serpae Tetra can tolerate soft to moderately hard (hardness to 25 dGH) acidic to basic (pH to 7.6)



The colouration of the Serpae Tetra varies from the crimson shown here to an orangey red.



The Rio Cuiabá in Mato Grosso, western Brazil hosts a number of newly described species of *Hypessobrycon*, along with staples of the freshwater hobby like the Serpae Tetra.



The Bleeding Heart Tetra is aptly named. Best kept in densely planted aquariums, always in a school, preferably in a large school.
Photo by Budi Lukman.

water, temperature 22-28°C/72-82°F. Occurs in sluggish streams and ponds, frequently around marginal vegetation and submerged branches. Although it tolerates harder basic water, it is at its best in colouration and behaviour--and will only spawn--in soft, acidic water.

These fish are omnivorous and will appreciate almost every food given to them.

BLEEDING HEART TETRA

HYPHESSOBRYCON ERYTHROSTIGMA

There are three closely-related species, all growing slightly larger than other rosy tetra species. *H. erythrostigma* is the largest and most commonly seen, and is now (over the past decade) being commercially bred. *H. socolofi* is very similar but slightly smaller, and the elongated dorsals and anal fin lobes on the males are only slightly longer than the females.

The third species, *H. pyrrhonotus*, was described and named by Burgess in 1993, and is commonly called the Flame-back Bleeding Heart Tetra.

This fish frequently pales in colour, particularly when

kept in basic water or barren tanks. Maintained in soft, acid water in a well-planted aquarium with a very dark substrate and very dim light, the fish becomes at ease and the colourings intensify dramatically; it is a vastly different fish in appearance from what is seen in the store tank.

A peaceful, slightly larger tetra suitable as tankmates for angelfish, other peaceful characins, rasbora, danios, gourami, small catfish and loaches, and smaller New World cichlids. Should be kept in a group of at least six but preferably more. In its native waters in Igaraope Preto, this fish is found in company with the neon tetra in small blackwater streams.

Bleeding Heart tetras prefer soft (hardness to 12 dGH) acidic to slightly basic (pH to 7.2) water, temperature 23-28°C/73-82°F. Occurs in dark or dimly-lit sluggish streams in forested areas.

The Bleeding heart is more carnivorous in nature, it accepts most prepared foods including flake and frozen.



The Kitty Tetra (*Hyphessobrycon heliacus*) is an unusual *Hyphessobrycon* that's not always available in stores. Its body is a striking yellow-gold. The species has a comparatively limited distribution, occurring in the Teles Pires River, in the upper Tapajós basin, Brazil. Photo by Budi Lukman.

CONCLUSION

Hyphessobrycon Tetras have become one of the more popular tropical community fish choices for aquarists worldwide. They are in general peaceful, hardy and easy to keep, colourful, look great in a school, available in a myriad of different species and above all else represent excellent value for money.

If you have yet to be exposed to the world of *Hyphessobrycon* tetras these little gems of the tetra world will not disappoint you. Add a school to your community tank today.

REFERENCES & RECOMMENDED READING

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ABOUT THE AUTHOR

Pip Court

Pip has been keeping ornamental fresh and saltwater fish for the past 22yrs. Pip's hobby passion is so great that she has spent the last ten years working for both aquarium wholesalers and retail outlets, and currently manages Reef River Reptile, in Sydney Australia. Pip has travelled to both Europe and Singapore to attend major trade shows, Interzoo and Aquarama respectively, where she was also able to visit numerous fish farms and wholesalers.





photo by Khantipol

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5 Easy Plant Choices!

By Meghan Helmer

Whether you have recently begun aquascaping, experienced difficulty in the past with growing aquatic plants, or are looking for an easy to maintain set up; the plants in this article are just what you need. They are considered easy to grow because they generally do not have intensive lighting or nutritional needs, and can often grow well with minimal care.

Java Moss - *Taxiphyllum barbieri*

Probably one of the easiest to acquire plants in the hobby is Java Moss. One does not usually have to search hard to find a fellow hobbyist who is willing to donate a portion of their plant to you.

Java Moss is a nice deep green coloured aquatic moss and has a fluffy, soft appearance. The leaves on Java Moss are almost indistinguishable from the stem. It is a low light preferring plant, and can usually subsist off of minimal nutrition provided by fish waste or light fertilization. In fact, Java Moss is so tough; it can survive a range of water conditions, so pH and water hardness needn't be too much of a concern. Java Moss is also special since it is one of the rare freshwater plants which will survive well in a brackish aquarium.

However, it must be warned that this innocent looking moss can easily take over your tank. It will attach to almost anything, so regular pruning is recommended. Pruning Java Moss is a simple task, as you can remove as much of the moss from the aquarium as needed without any detriment to the remainder of the plant. Be wary of letting it attach to filter or power head intakes, as it can clog them and prevent them from running properly.



Java Moss has a soft appearance and can get unruly if not maintained regularly. Here it is used to good effect in the background of the aquarium to hide the glass. Loose aquarium-safe mesh can be used to support the moss.

Like most of the aquatic mosses, you can grow Java Moss in creative ways. As an example you could grow a wall or carpet by weaving the moss into aquarium safe canvas or mesh; whichever way Java Moss is “molded” it tends to hold its shape well. This arguably makes Java Moss the best plant to choose when creating a classic aquascape “carpet” in the foreground of the aquarium.

Another pleasing way to grow Java Moss is to anchor it on to driftwood or rocks. Many successful, but simple aquascapes use Java Moss and wood to imitate a lush, verdant forest.

Since Java Moss is a densely-growing plant, it also makes an excellent media for collecting fish eggs during breeding, or as a protective area for baby fry and freshwater shrimp.

It is also a recommended plant for cichlid tanks, as it can easily withstand the constant uprooting and rearranging which some cichlids are notorious for.

Java Fern - *Microsorum pteropus*

One of the most commonly recommended beginner plants in the aquarium hobby is the Java Fern. Java Fern is adored for its dark green, wild, unkempt looking leaves. It is classified as a true fern, and closely resembles its land dwelling relatives.

One of the most iconic ways to display a Java Fern is to grow it on a log. This can be done by tying the plant with cotton twine or fishing line until the roots anchor themselves in to the wood. Java Fern and Java Moss are often paired together as complimentary plants that look excellent when grown side by side.

It is a slow grower, but can reach up to 30cm in height. Due to this it is best placed in the mid ground or background of the aquascape. Java Fern adapts well to different PH and temperature ranges. Much like the Java Moss, it is another species which can be successfully kept in brackish water aquariums.

One of the rare few mistakes you can make in effectively caring for Java Ferns is to bury the rhizomes (the large horizontal stem on the bottom of the plant) into the substrate. This can cause the plant to rot due to anaerobic conditions.

Keep in mind this plant does not like overly bright lighting, so it must be either kept in a low light tank or shaded by other plants.

It should be noted that Java Fern reproduces both through baby plantlets and spores. Spore reproduction is similar to land dwelling ferns. The spores of the Java Fern are commonly mistaken by hobbyists as a sign of poor health in the plant. Since these spores are black in colour,



Java Fern is one of a relatively small number of aquatic ferns. It is a classic aquarium plant, and is arguably amongst the best for beginners as spectacular growth can be obtained easily under low light and without fertilization.



The attractive Windelov variety of Java Fern is just as easy to grow as the normal form.
Photo by Budi Lukman.

they can be mistaken for rotten or damaged leaves. This plant will also slowly grow out wider by creating new shoots along its rhizome. It is possible to cut the rhizome in to individual pieces, in order to create new plants, but be sure to keep some leaves on the cutting to allow it to perform photosynthesis.

There are a couple of different varieties of Java Fern which have been cultivated over the years. For instance, there is the “windelov” variety, which has taller, thinner leaves with a fringe look on the tips. There is also a “narrow” variety which, unsurprisingly, grows narrower leaves than the regular Java Fern.

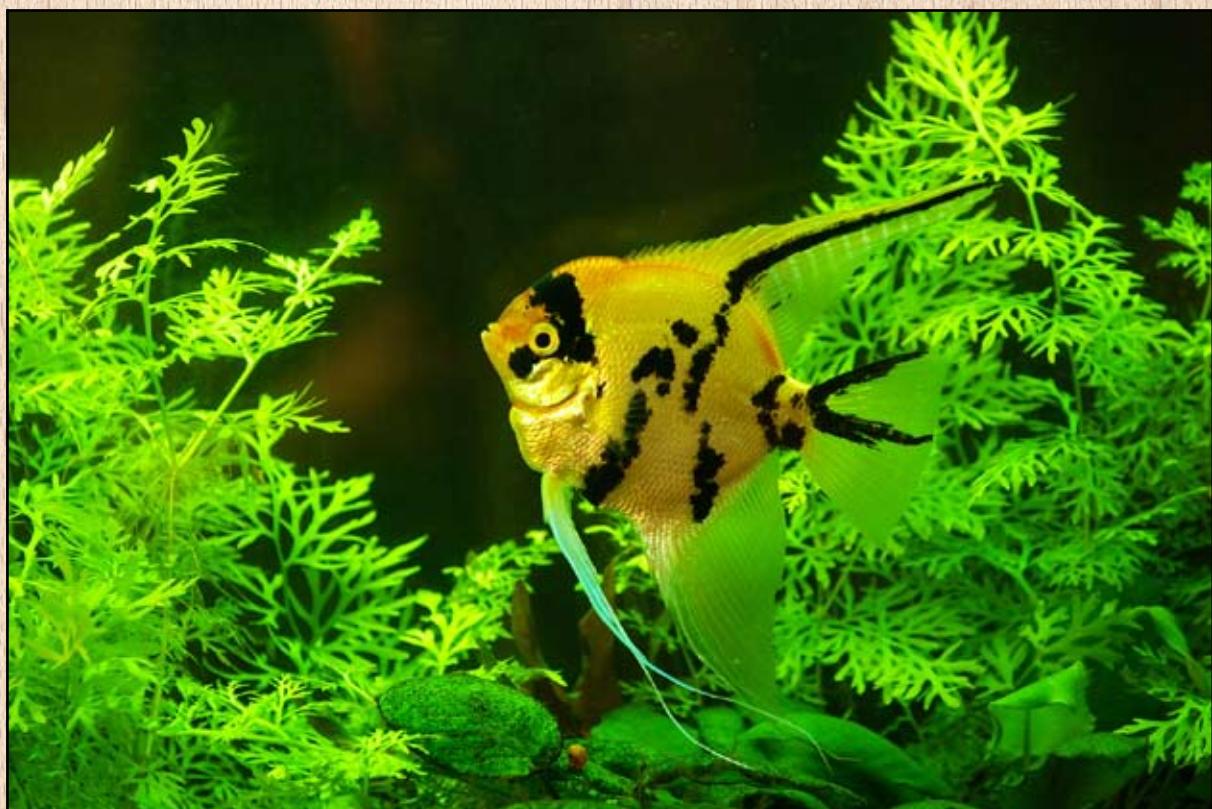
Water Sprite - *Ceratopteris thalictroides*

Water sprite, also known as Indian Fern, is a light green, leafy fern which can be found in many tropical areas around the world. Its thin, delicate leaves give it a beautiful ornamental appearance which is favoured by many hobbyists and its fast growing nature can result in pleasing results fairly rapidly.

This plant can reach a height of 100cm at its tallest, so it is best to place it in the background of an aquascape. Water sprite will thrive strongly if kept under more intense lighting than Java Fern or Java Moss, but still this plant is not the most demanding of light in the hobby. Once again the pH and water hardness levels do not really factor into Water sprite’s care, as this hardy plant seems to do well in most water parameters.

It is a very versatile plant which can grow in substrate, tied on to ornaments or left floating at the top of the aquarium. If left floating, it will eventually begin to raise sections of itself out of the water. Floating Water sprite causes the leaves and stem of the plant to take on a spikier, more rugged look. Floating the plant also makes excellent cover for raising fry, holding on to betta bubble nests, or subduing the light for photo sensitive life in your aquarium.

Water sprite can be easily propagated by snipping off a small part of the top of the plant and allowing it to grow on its own. This plant can also develop baby plantlets which will drop off and grow independently without any



An angelfish majestically glides through an aquarium planted with Water Sprite. The finely branched leaves are the submerged form - when above (or on) the surface, the leaves change form and become thicker and less branched.

aid. The growth of these plantlets has no bearing on the placement of the Water sprite. It will produce plantlets both as a floating plant or submersed.

Water sprite is a quick grower, and regular pruning is recommended, especially in smaller aquariums where it can easily become over grown. This is especially the case if it is left to float at the top of the aquarium as it will tend to grow excessively with access to the majority of the light. This can cause the plant to choke out the light to the other plants below.

Water wisteria - *Hygrophila difformis*

This light green stem plant hailing from South East Asia is very versatile, and as the Latin name suggests, will "deform" or adapt to different aquarium environments by changing the shape of its leaves. In low light tanks, the leaves will be wider and more petal-shaped; while in high light the leaves become finer and denser. In some ways it bears similarity in colour and leaf shape to the green top of a carrot. The leaves are delicate, so care must be taken not to damage them while moving or planting.

This plant will grow well in a low light tank, but has the potential to really thrive well in a medium or high light aquarium.

As with all of the plants on this list, Water Wisteria will do well in a wide range of tank temperatures. pH and water hardness levels of a varying range are also acceptable for this easy to care for plant.

Water Wisteria can grow up to around 50 cm in height, and is such an opportunistic grower; it can easily take over the space in a smaller aquarium if minimal lighting and nutrient levels are met. It is especially beneficial in a new tank, where it will thrive on nitrates aiding in algae prevention. In older, more established, plant tanks it would do well to be given regular fertilization.

It can be propagated by cuttings taken from the leaves, which may then be placed into substrate and will quickly develop into new plants with roots of their own. It will also develop plantlets, much like the Water sprite, which it will release on its own given enough time and good care.

As it is such a prolific grower, this plant definitely should be kept in the background of an aquascape and needs to be pruned frequently so that other plants are not smothered by it. When considering placing it in an aquascape, try to position it near darker coloured plants in order to provide some contrast.



Water wisteria is not related to the garden plant that shares its common name. The species is an adaptable aquarium plant and is a good choice for the new aquarist.



a tall stem plant, Wisteria is best used at the rear of the aquarium as shown here.

Anubias varieties - *Anubias barteri* var. *barteri*, *Anubias barteri* var. *Nana*, *Anubias* var. *Nana Petite*

Anubias barteri var. *barteri* is a dark green, wide leafed plant that can grow as tall as 45 cm. Like most of the other plants in this article, it adapts well to different water parameters. However, *Anubias* favours low light, in which it will grow larger, wider leaves. It is a slow growing plant, and must be protected from strong lighting to discourage algae growth on its leaves.

Similarly to Java Fern, *Anubias* needs to have its rhizome above the substrate or it may decompose or limit plant growth. This makes it a good candidate for attaching to driftwood or rocks. Due to its relatively tall height, this plant would make a good background feature in an aquascape. Just like the Java Fern, larger plants can be divided by slicing parts of the rhizome into even sections, and replanted. Once again, be sure to keep a few leaves on each rhizome so that the plant will be able to perform photosynthesis. There are a few different varieties available:

Anubias var. *Nana* is a smaller version of *Anubias barteri* which grows to about 10 cm at its tallest. It is a good background to mid ground plant, and is a recommended alternative to *Anubias barteri* var. *barteri* in tanks under 113 litres in size.

Anubias var. *Nana* "petite" is a popular variety which is perfect for nano tanks or aquarists who want a small petal-leaf look in their tank. As the name suggests, it is a miniature mutation of *Anubias barteri* "nana", and only reaches a height of about 5cm. It makes an excellent fore to mid ground plant due to its short height, and looks very attractive when grown attached to driftwood in small groupings. *Anubias barteri* var *coffefolia* is another variety which has only recently become more readily available in the hobby. It is similar in size to *Anubias barteri* in appearance, but grows shorter, maxing out at a height of around 15 cm. It also differs in the texture of the leaves, which appear to have deep grooves and give the plant a crisper, textured appearance.

The above plant varieties are just a few examples of the wide range of undemanding, simple to grow plants available to the hobbyist looking for easy aquascaping solutions. As you can see these plants have basic care requirements allowing you to enjoy your aquascaping hobby while minimizing stress and effort.

Whether you have recently begun aquascaping, experienced difficulty in the past with growing aquatic plants, or are looking for an easy to maintain set up; the plants in this article are just what you need. They are considered easy to grow because they generally do not have intensive lighting or nutritional needs, and can often grow well with minimal care.



Anubias heterophylla. Note the thick fleshy rhizome. Photo: S. Tanaka.



In this aquascape, dwarf *Anubias* varieties are used in the foreground to great effect.

ABOUT THE AUTHOR

Meghan Helmer

Meghan Helmer has always had a passion for nature and fish keeping. Growing up around the lush green forests of British Columbia she developed an appreciation for the beauty and calmness that comes from being outdoors. Although she has always owned aquariums, she has recently been able to find an outlet for both of her passions in the art of aquascaping. She also currently manages the fish section of a local pet store.



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IT'S HIP TO BE SQUARE

BY AARON SEWELL



The Tetraodontiformes (also known as plecognath) are an order of ray finned fishes that include a number of families that are relatively well known to aquarists. Among them are the triggerfishes, boxfishes, cowfishes, porcupinefishes, filefishes as well as some families that are not common to aquarists including the sunfishes, deepwater (or temperate) boxfishes and three-toothed pufferfishes. This group is a highly derived

order of fish that evolved around 40 million years ago which is relatively recently considering ray finned fishes date back as far as 420 million years and the order Perciformes (which contains the majority of marine fishes kept by aquarists) first appeared between 70-80 million years ago.

Members of the order Tetraodontiformes, with the exception of the family balistidae (triggerfishes)

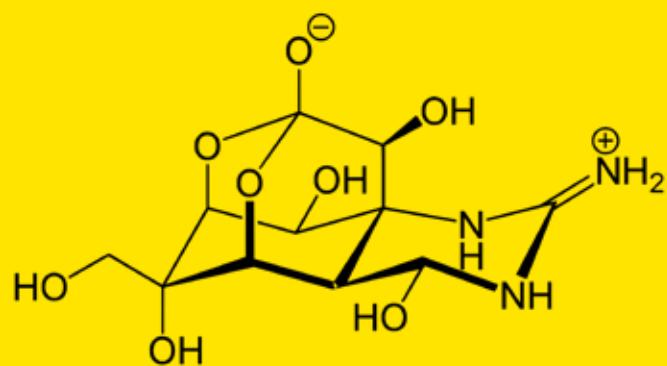


In the wild puffers are frequently social creatures. While not all species are brightly coloured, they are frequently interestingly patterned and with their unique body form there's something in this group to please the most jaded aquarist!

are laterally inflexible, which means they cannot use their body movement for propulsion and therefore rely on their fins for both propulsion and steering. This means they are generally slow moving fish and they therefore rely on a relatively complex defence systems for predator evasion. Among these defensive mechanisms are fused scales, horns (solid, calcareous facial spines, as found in cowfishes), highly elastic stomachs that can swell (when filled with water or air) and substantially increase the body size of the fish or most importantly the presence of a potentially lethal neurotoxin.

Pufferfishes are notorious for their potent toxin, making the fish inedible unless prepared by skilled fugu chefs. The toxin these fish possess is a tetrodotoxin (TTX), named for its presence in tetraodonts including pufferfishes and porcupinefishes. This toxin is produced by several bacterial species including *Microbacterium arabinogalactanolyticum*, *Serratia marcescens*, *Vibrio alginolyticus* and *Bacillus* spp. and is then concentrated in the skin and liver of the fish with smaller amounts found throughout the digestive system. TTX is a powerful neurotoxin with symp-

toms ranging from initial numbness of the tongue and lips to paralysis, seizures and respiratory failure often resulting in death. In humans initial symptoms



can occur in as little as 15 minutes and death can be in as little as 4-6 hours. A similar toxin (Ostracitoxin) is found in members of the family Ostraciidae. These toxins are among the most potent toxins found in vertebrates and are almost identical in chemistry to the well known toxins found in blue ring and blue-lined octopuses (maculotoxin [MTX] and hapalotoxin). To put the toxicity level of these toxins into

perspective, TTX is approximately 1200 times more toxic than cyanide.

One of the considerations when deciding whether to add any tetraodont to an aquarium is what else is being housed in the aquarium. Tetraodonts have very powerful jaws that make them capable of consuming just about anything they get their mouth on, from motile animals such as worms, crustaceans, snails and fish to sessile invertebrates such as bivalves, corals, sponges and tunicates. While most tetraodonts are relatively slow moving fish, some, especially triggerfish, are quite quick and opportunistic. Tetraodonts are generally only recommended for fish only aquariums and even then, they are known to nip at fins of other fish.

PUFFERFISHES

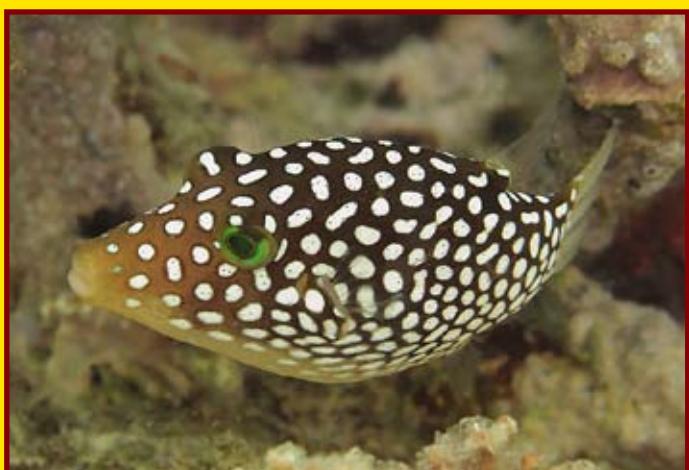
Pufferfish, Family: Tetraodontidae, are probably the most well known tetraodonts and they are fairly well represented in the aquarium trade. They are largely distinguished by their ability to inflate their stomach in order to increase their body size making them less prone to ingestion and even predation by other fish, though this trait is also shared by the porcupinefishes (Diodontidae).

Their name is derived from the Greek root words 'tetra' meaning four and '-odont' meaning tooth. Not surprisingly, pufferfish have four teeth. One thing that should be noted by aquarists wanting to keep a pufferfish is that for many species, the teeth should be trimmed (or less desirably, filed) in order to prevent them from becoming overgrown which renders the fish incapable of feeding. It is possible to manage the teeth of pufferfish in the aquarium without the need to trim them by managing the diet but this can be difficult. Pufferfish in the wild will feed largely on hard foods such as molluscs, corals and hard shelled crustaceans (such as barnacles or crabs) which will help to wear the teeth down. In captivity when they are offered soft foods such as flake, pellets or the various frozen foods available, there is little wear on the teeth and they become problematic. In fact, when soft and hard foods are offered together, pufferfish will often choose the soft foods meaning that offering a mix of foods is still insufficient.

Some of the more common pufferfish offered to aquarists include the tobies or sharpnose puffers (*Canthigaster* spp., subfamily *Canthigasterinae*) and dogface puffers (*Arothron* spp.). The former are



the aptly named Dog-Face Puffer (*Arothron nigropunctatus*). This individual was photographed at Colchester Zoo by William Warby.



The marked pattern on this Hawaiian White Spotted Pufferfish make it very desirable to many an aquarist. Limited to Hawaiian waters, its not always available for purchase.



The beautiful Hawaiian Blue Puffer (*Canthigaster papua*) is an easy to keep species that grows only to approximately 10cm in length. Despite its colour and ease of care the species is not always available.



A common tropical around eastern Australia to New Caladonia, the Clown Toad (*Canthigaster callisterna*) isn't commonly seen in aquariums.

more suitable for the average aquarium, reaching sizes of only around 10-15cm while the latter has members that can reach sizes of up to 1.5m (*A. stellatus*) though the more commonly available species reach around 30-50cm. Sharp nose puffers are relatively peaceful fish though they are known to nip at fins of other fish and they are quite territorial and may not tolerate other male sharpnose puffers of the same

or different species in close proximity. Some species are moderately sexually dichromic and when keeping multiple sharpnose puffers in an aquarium, females are much more suitable.



The narrow-lined puffer, *Arothron manilensis*, is found in the western Pacific. It makes a beautiful addition to the fish-only aquarium. It's intolerant of its own kind in all but the largest of tanks.



The Star Puffer (*Arothron stellatus*) inflating itself as part of a defensive display! Photo by Tanaka Juuyoh

FILEFISHES/LEATHERJACKETS

Filefish, Family: Monacanthidae (or better known to fishermen as leatherjackets) are relatively uncommon in the trade though there are some species that pop up on occasion. The most common species available to aquarists are the Longnose Filefish (*Oxymonacanthus longirostris*) and the Valentini Mimic Filefish (*Paralutereres prionurus*). The former is an obligative corallivore (feeds only on live corals) and is therefore notoriously difficult to maintain in an aquarium long term. Longnose Filefish feed almost exclusively on the polyps of Acroporid and Pocilloporid corals which few aquarists are willing to continually sacrifice in order to keep these beautiful fish alive. The Valentine Mimic Filefish is one of several species of filefish which mimic the appearance of *Canthigaster* spp. Pufferfish. This is an example of Batesian mimicry where a non-poisonous species mimics a poisonous species in order to deceive predators thereby reducing their risk of being eaten.

The name Monacanthidae derives from the Greek



A pair of the beautifully bizarre (*Oxymonacanthus longirostris*) on a reef in Vanuatu. This species is strictly for experts and has dietary requirements that most aquarists simply can't meet. We'd recommend viewing the species in the wild instead!



The Blacksaddled Toby (*Canthigaster valentini*) is a pufferfish which is commonly kept in the aquarium. Like all pufferfish it's poisonous and its resemblance to the Valentini Mimic (below) isn't coincidental.



The Valentini Mimic (*Paralutereres prionurus*) looks quite a bit like the poisonous Blacksaddled Toby! Photo by Jens Petersen.

words 'mono-' meaning one and '-akantha' meaning spine or thorn. This relates to the retractable spine located at the front of the dorsal fin. In reality there are 2 spines despite their name but the 2nd spine is only very small and is used to lock the front or main spine in place. There are two purposes for the spine, both defence mechanisms used to reduce the possibility of predation. The first is to inhibit ingestion by larger predators such as groupers which would attempt to consume the fish whole and in the process would end up with the spine lodged in the roof of their mouth or throat. Secondly, it can be used to lock the fish in place amongst rocks or coral preventing predators from pulling it out. The second purpose is often encountered by aquarists when trying to remove the fish from the aquarium, the fish will swim into rockwork, raise its spine and become near impossible to remove.

BOXFISHES AND COWFISHES FAMILY: OSCTRACIIDAE

While there are only a few species of ostraciids available to aquarists (in fact only about 20 species in the family) they are remarkably popular fish. These fish are noted for their hard body that is near square or trapezoidal in cross section. These fish possess large hexagonal shaped scales that interlock making the body extremely rigid. This makes it very difficult for predators to either consume them whole or for smaller predators to bite chunks of flesh from their body. This, along with the aforementioned ostraci-toxin, makes the risk of succumbing to predation very low for these fish. This means that despite their relatively limited mobility, bright colouration does not pose a significant problem for boxfish and cowfish with many sporting bright blues and yellows.

The most common species available to aquarists are the Longhorn Cowfish (*Lactoria cornuta*) and the Yellow or Spotted Boxfish (*Ostracion cubicus*) while the Black Boxfish (*O. meleagris*) and Solor Boxfish (*O. solorensis*) are also available from time to time. The more common species are actually the larger of those available with the Longhorn Cowfish and Yellow Boxfish reaching 50 and 45cm respectively while the 2 less common species reach a more manageable size of around 15cm. Not all species are sexually dichromic but male Black and Solor Boxfish are remarkably beautiful fish making them fairly highly sought after.

In the aquarium, boxfish and cowfish are usually not difficult to get feeding on prepared foods but they are notoriously susceptible to pathogens, especially whitespot (*Cryptocaryon irritans*). It is highly recommended that these fish are quarantined before being added to the aquarium (as all fish should be) in order to reduce the risk of introducing the pathogen to the aquarium.

PORCUPINEFISHES

Porcupinefish (family Diodontidae) are not particularly common in the aquarium trade and they are not especially sought after but they do appear from time to time. Most that appear in the trade are simply sold as porcupinefish with no further identification given by collectors or retailers. With maximum sizes ranging from around 20-50cm, it is important to more accurately identify individuals to



The Yellow Spotted Boxfish is a beautiful and striking creature. Its cubic shape and bright colour make it a favourite amongst marine fish enthusiasts.



While they're called Black Boxfish, *O. meleagris* is really a mosaic of colour!
Photo by divemecressi @ flickr.com.

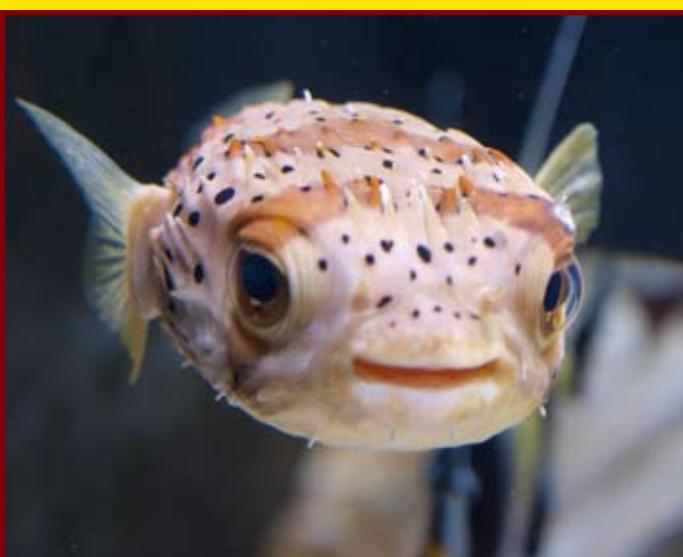


Longhorned Cowfish are very popular with aquarists, and while they are straightforward to keep they are prone to white spot.



This is the image that most non-aquarists have of porcupine fish (*Diodon holocanthus*).

Photo by Ibrahim Iujaz.



Diodon holocanthus in its “non-inflated” state resembles its puffer cousins fairly closely.



Other porcupine fish, such as this Spotfin Burrfish (*Chilomycterus atringa*) are rarely encountered in the hobby. Photo by Philippe Guillaume.

ensure they will be suitable for your aquarium. There are two main features that differentiate porcupinefishes from pufferfishes. The first is the very obvious covering of spines over the body of porcupinefishes (hence the name) and the second is the fusion of teeth in porcupinefishes resulting in just 2 rather than 4 teeth. The spines are modified scales and depending on genus may lay flat against the body until the fish inflates which causes the spines to raise or they may be permanently raised. The name Diodontidae comes from the Greek word ‘di-’ which means 2 and ‘odont’ which means tooth. Porcupinefishes diverged from pufferfish around 30-32 million years ago which is a reason why the two families still retain so many similarities.

Like pufferfishes or most other tetraodontiformes, porcupinefishes are not well suited to reef aquaria and are best suited to large fish only aquaria where they are among the smallest fish in the aquarium as they often harass smaller fish and nip at their fins. However, unlike many other tetraodontiformes, porcupinefishes are generally not as colourful and most commonly sport more subtle colours such as browns, greys with occasional earthy tones of reds, oranges and yellows.

BALISTIDAE – TRIGGERFISHES

Notorious for their aggression, triggerfishes differ from other members of the order by having a flexible body which means they are not slow moving like other members of the order. They are most similar to the monacanthids in that they also possess a set of hard spines (3 in the case of balistids as opposed to 2 in monacanthids) in front of the dorsal fin which can be locked in place. For most species the diet is similar to that of other tetraodontids, benthic invertebrates, though their relatively quick motion allows them to also feed on other fish. The name balistidae comes from the Greek word ‘ballista’ which refers to large weapons which fire projectiles such as catapults. The dorsal spine flicks up in a catapult-like motion giving these fish their name. For more information on triggerfishes, refer to issue 4 of Redfish Magazine.

CONCLUSION

One thing tetraodontiformes are notorious for is personality. While they may not be the most active, nor the most colourful of fish (with some exceptions), they are generally quite fearless due to their

extensive array of defence mechanisms. They are generally quite willing to accept a range of prepared foods and should be offered a range of meaty foods such as whole prawns, mysis shrimp and even mussels or whole fish (such as whitebait) depending on species. On the whole, tetraodontiformes make excellent additions to aquariums, though compatibility with benthic invertebrates is very low so these fish are ideal for fish only aquariums.



For a detailed look at Triggerfish - please see Redfish Magazine Issue #4.

ABOUT THE AUTHOR

Aaron Sewell



In 2004 Aaron completed a BSc (Marine Science) at the University of Sydney with majors in marine biology and tropical marine science. Since 2001 he has been involved with the aquarium industry at hobbyist and retail level and now works in aquarium product development. Aaron is a former committee member of the Marine Aquarium Society of Sydney and has collected fish and corals in Fiji for the US and European aquarium industries. Aaron has been writing for several local and international aquarium magazines since 2004.



Photo by Budi Lukman

Whisker corals

The Whisker Coral (*Duncanopsammia axifuga*) is an excellent species for the reef aquarium which has many positive attributes. It's a Large Polyp Stony (LPS) type coral and is one of the easier members of this generally hardy group to keep. It may also be found under the common names of Duncanops Coral or Duncan Coral.

There are two morphs of this species, a green coloured and a pink coloured one. Each individual polyp grows to about an inch (2.5 cm) across.

Water parameters for this species should be maintained as one would for any LPS coral – excellent water quality is very important. In particular, calcium levels need to be above 400 ppm (430-480 ppm is generally recommended) to allow the coral to lay down its calcareous skeleton. Phosphate and nitrate levels need to be low, or growth can be slowed. The preferred temperature range is 75-80°F (24-27°C). Water current and flow does not need to be strong – a medium current is fine but very harsh currents may cause the polyps to close up.

Lighting is one area in which this species is very adaptable. In nature *D. axifuga* is found in rocky areas and also sandbeds in tropical Australian waters and also the South China Sea, often in deeper water than most hard coral species. As a result, it is tolerant of lower light levels - though of course, decent



lighting is still necessary! Since it is a deep water species it can also be placed lower down in the reef setup, and is quite happy to be placed on a sand bed.

Many LPS coral species produce long stinging "sweeper" tentacles which are used to attack competing neighbours. The Whisker Coral doesn't have these - it's a relatively non-aggressive coral which doesn't tend to harm other corals around it. This does mean that it is vulnerable to attack itself, so it shouldn't be placed too close to other more aggressive corals. *D. axifuga* is considered to be a hardy and easily cared for species but there is one area of care that can trip up beginner reef keepers. Whilst the polyps do contain photosynthetic zooxanthellae, this coral does need regular feeding in order to thrive. Meaty foods such as brine shrimp and small chunks of prawn or fish are good choices, but should be delivered to the polyps via forceps so that your fingers avoid the stinging nematocysts in the tentacles! This coral can be such a voracious feeder that it can be tempting to feed it too often. Overfeeding won't directly harm this coral, but putting a lot of extra food into the reef environment can quickly decrease water quality which is detrimental to the corals. Feeding once or twice a week with good quality food is ideal.

With the correct conditions this coral will grow fairly quickly to produce a nice sized clump. While many LPS corals are considered difficult to propagate, this species is amenable to being divided up to make new colonies by separating polyps off the main clump. This relative ease of propagation has meant that this once rare and expensive species is now becoming more readily obtainable.



Back from the brink

TURNING AROUND A TOXIC TANK

by Raul Roman

Now is not the time to panic and you most certainly don't want to overreact but let's not sugarcoat things; your aquarium is in decline. What you need to do is to employ a focused and effective strategy to turn things around for the better. In this article I will discuss the steps you need to deploy in order to win this battle and return your aquarium to a state of good health and beauty.

This is something that has happened to most hobbyists. The reasons for your tank's decline can be many and perhaps it's merely a case of neglect which you now plan to reverse. Many times this scenario is not difficult to address successfully if you haven't let things decline past a certain point. What if you haven't been neglecting your reef aquarium or your planted freshwater tank? Sometimes this just sneaks up on the best of us. It usually starts with the emergence of some nuisance algae which slowly and steadily starts to consume more and more of your aquarium's real-estate. You might also notice that your aquarium's inhabitants don't look as healthy and vibrant as they once were. In your reef aquarium this might manifest itself in reduced coral polyp extension and reduced coral coloration. In a freshwater aquarium you'll start to see plant die-off and a shift in the color saturation of your plants. You probably already know you have a problem and all you need now is a way to get things back to their former glory.

Before we discuss what you'll need to do to get things back on track, I want to take a few sentences to talk about the things you need to avoid doing. Don't overreact and try to turn things around overnight. Your aquarium likely didn't get to this point overnight and you will most certainly fail if you rush its restoration. Be very leery of miracle remedies in a bottle, some have their place and purpose but none will fix all your problems with their mere addition. Do not employ the calculated

approach outlined in this article if you are rapidly losing livestock. If that is where you find yourself then let me suggest that you setup a temporary hospital aquarium to house your livestock while you get your main aquarium back on track.

As you likely have come to know by now, there are many prescriptions and methodologies that will lead one to successfully maintaining an aquarium. I would recommend that you study and expose yourself to several of the more popular and successful approaches with the aim of learning about the art and science of our hobby with the aim of finding the particular elements that will work best for your specific situation. Having said that, following are some of the techniques that have worked best for me and many of my aquarist colleagues and friends but these are by no means the only correct ways to tackle the problems discussed in this article. These procedures are listed in the order of preferred execution but you might find that your situation best benefits from a slightly modified order.

Gathering Data

You will be best served by having concrete numbers on hand for the various water parameters commonly tested for in the aquarium hobby. This is particularly helpful when seeking help on online hobby forums as this is the first question you will be asked by those responding to your questions. Test your salinity, temperature, pH, alkalinity, nitrate and phosphate levels as these are the likely culprits of a declining aquarium. If you have overly distressed livestock you'll want to check ammonia and nitrite levels also. In a reef aquarium calcium and magnesium levels should be checked if you are seeing signs of anemic growth in your hard corals and clams. Make sure you are gathering good data by using good test kits with fresh reagents and properly calibrated probes. Check your numbers twice but better yet take a water sample to your local fish store for confirmation of your results.



Stocking, and changes in stocking, are key factors in aquarium decline. If you've got dense stocking rates - chances are you'll have to have very substantial maintenance and filtration requirements. In some senses, stocking rate effectively dictates margin of error, so be aware when you add new stock of the holistic effect on your setup of this new addition.

Don't forget to test your water source. If you have a Reverse Osmosis filtration system it might be time to replace the RO membrane or the activated carbon section of your RO unit. A TDS meter will give you the data you need to determine if maintenance is needed. If you are using tap water then consider filtering the water prior to using it in your tank. For those of you who get your fresh or saltwater ready-made and filtered from your local fish store, be sure to ask if they test their water regularly. When they are in a habit of doing so they will likely look to tell you about the specific tests they run and the equipment used to test it.

Your test results will give you a good indication of what needs correction and for some of these that are out of normal range you can apply a simple correction (salinity, temperature) being careful not to let your parameters shift abruptly. High levels of nitrate and phosphate are the two parameters we'll be looking to correct with many of the prescribed actions listed in this article. Since a complete discussion of the various water parameters is beyond the scope and focus of this article I will advise that you consult an aquarium water parameters reference or that you post questions regarding your test results on one of the aquarium water chemistry forums available online.

What is the maintenance status of your equipment? How old are your light bulbs? When was the last time you properly serviced your filtration equipment? I'm not just referring to disposable filter media but also the phys-

ical condition of the equipment. You'll want to be on the lookout for equipment that is running poorly due to worn or excessively dirty parts (pump impellers, Venturi ports, etc.) Diminished water flow from worn or dirty equipment and aging light bulbs whose color spectrum has shifted towards the red and yellow are often the fuel that feeds nuisance algae outbreaks. Bring any faulty, dirty or expired equipment and media to their proper condition. And do your best to maintain a better maintenance schedule.

Checking for Hidden Pollution

A build up of detritus (particles of fish waste and other dead organic materials) and sludge are often the causes of elevated nitrate and phosphate levels which in turn fuel the growth and spread of nuisance algae while also restricting chemical and biological processes needed by your corals and other livestock. Detritus is often found buried in your substrate or settled in your filters and sump. Sludge can collect in alarming quantities in much of your aquarium's plumbing, particularly in older aquarium setups that don't regularly have their pipes and tubing inspected and cleaned. Check a section of your plumbing and assume that if you find significant sludge buildup then you likely have it also coating the rest of your plumbing's internals. To check for an excessive buildup of detritus in your substrate gently stir a small section of your tank's substrate being sure to stir down past the first couple of inches of substrate.

Detritus in your sump and sludge build-up in your pipes can easily be addressed without much other consideration but a detritus filled substrate, often referred to as a nutrient sink, requires some special attention and I'll address that a little bit later in the article. I have found a neglected substrate to be the number 1 reason as to why a previously successful aquarium falls into decline a year or two into its life.

Another source of hidden pollution is disguised amongst the food that you feed your animals. Frozen foods are particularly guilty of introducing unwanted substances such as phosphates. Test a sample of aquarium water that has been used to thaw out some frozen fare. You might be surprised how much phosphate is sneaking into your aquarium every time you feed. Thaw and rinse most frozen foods prior to feeding them to your tank's inhabitants.

Do You Have the Right Stuff?

Was your aquarium thriving with its current equip-



Live rock acts as a filter in and of itself, however, it can restrict water flow in the substrate if placed injudiciously.

Photo by Codeslingr @ Wikimedia Commons.

ment in the recent past? Has your biological load significantly increased since you first commissioned your current filtration system? Even clean and properly maintained equipment can be a contributing factor to your aquarium's state of decline if it is inadequate for the job at hand.

Did your saltwater aquarium start with a simple canister filter running activated carbon and ceramic bio media? That might have worked well when all you had in your 55 gallon tank were 5 damsels and a few shrimp and crabs. But it's now a year later and your tank houses 10 damsels, a Snowflake Eel and a large One Spot Fox-face all being filtered by the same filter you started your tank with. If this is your scenario then it might be time to think about adding a protein skimmer or perhaps just replacing your canister filter with a higher capacity rated model. Water flow is another area often neglected due to changing aquarium needs. Perhaps you began your tank with some dry base rock but recently doubled the amount of rock in your tank by adding some live rock. Well this additional rock serves many useful purposes but

it also serves to block and constrict the water flow in your aquarium. Decreased water flow is responsible for detritus accumulation in the substrate and often presents a more hospitable environment to nuisance algae trying to take root in your aquarium. Research any new equipment purchase carefully and make sure that it's going to meet your needs.

Taking action

This is where you finally get to roll up your sleeves and start to take some corrective action. This all starts with some basic maintenance tasks performed with an increased frequency. I suggest that you increase your maintenance schedule frequency as suggested below for a period of one or two months in order to obtain the most benefit.

Water changes: Double up your usual frequency. Be sure to be changing at least 25% of your systems water volume. Many choose a monthly schedule out of convenience and we should now strive to do these every two weeks.

Chemical media replacement: if you were replacing your activated carbon on a monthly basis consider stepping it up to once per week for the next couple of months. If your phosphates tested high then add some phosphate reducing media to your maintenance routine. Be sure to carefully follow the instructions that come with the chemical media to determine the use of the appropriate amount of media for your situation and water volume.

Mechanical filtration: clean your filter pads and socks at least every 3 days for the next couple of months. Empty and clean your protein skimmer collection cup on the same schedule as your filter pads and socks. Keep detritus from accumulating in your sump by removing it on a weekly basis. Again, do this for a couple of months while we get things back under control.

Reduce your feeding amounts by 20% while you fight this battle. Just be sure to use quality foods specifically made for your inhabitants. If you feed prepared frozen foods be sure to thaw and rinse each portion prior to feeding.

Clean all equipment and plumbing determined to be in need of such cleaning. Don't neglect any piece of equipment. Some equipment is difficult to take apart in order to properly service it and this is often why they are the equipment that is often neglected

in your maintenance routine. This is perhaps something to consider when researching your next equipment purchase.

Manually remove any nuisance algae crowding your livestock in order to prevent it from doing any harm to your inhabitants. This next suggestion might seem a bit unorthodox but I will advise you against removing any other of the nuisance algae from your tank as its sudden removal will only aid in increasing the organics and chemicals that fuel their growth since they will no longer exist to consume these substances.

Your nuisance algae problem will be reduced and eventually conquered by decreasing their food source and eventually starving them out of existence for good. Watching your nuisance algae problem shrink before your eyes is not only good for your morale but is also a great indicator of the effectiveness of your battle plan.

If you determined that your lighting was in need of maintenance then refresh the old lighting with some new lighting burning at the proper color spectrum. If you keep a non-planted freshwater or saltwater aquarium consider shifting all your lighting above the 10K spectrum as this will reduce the light energy available to nuisance algae for photosynthesis without having a detrimental impact on your corals, fish and invertebrates. Reduce your photo period by about 20% so as to reduce the energy source utilized by nuisance algae. Do this for a month, keeping an eye for any negative effects on your livestock.

Last but not least is the need to reduce the nutrients, chemicals and detritus that builds up in your aquarium's substrate and rocks. I will outline two methods of action to combat this problem. The ideal and more efficient method may not be a feasible option for some aquarium setups and thus the inclusion of a less effective (effective nonetheless) method for those specific situations.

Clean Up Method #1:

Manual rinsing and vacuuming is the method I would choose to employ when at all possible. Because of our desire to maintain beneficial bacteria and micro-fauna in our substrate and rocks, we are forced to take a slow and deliberate approach in order to execute this particularly important action. In order to minimize impact to beneficial substrate inhabitants you will want to only clean a maximum of 25% of your substrate or rocks in any one cleaning installment being sure to



In Reef Aquariums, it's important to remember that Live Rock (as it's name suggests!) is alive and needs to be thought of as a kind of super-organism. When cycling, and particularly during the dreaded "curing" phase, Live Rock is a source of nutrients (both nitrogen and phosphorus) to the aquarium. Only once this process is complete do the microbes, microfauna and algae on the rock become a sink for these compounds.

let a minimum of one week pass before you perform another partial cleaning.

Not only will this aide in maintaining desirable life in our substrate but it will minimize the disturbance and subsequent release of harmful gasses sometimes trapped deep in the substrate. Hydrogen sulfide is of most concern and it can be detected by the tell-tail rotten egg smell given off by this poisonous gas. Because of this possible danger it is my recommendation that you run fresh activated carbon in a filter while performing the cleaning of the substrate and that you perform a 25% water change immediately after concluding each weekly cleaning.

Rocks are best cleaned by removing them from the display tank and vigorously shaking each rock in a container filled with clean water from the display aquarium. The goal here is to rinse out detritus, uneaten food and other particulate pollutants that settle on the rocks.

Care should be exercised when moving rocks as an accidental contact between the rock and aquarium glass could result in a catastrophic failure. Be mindful and ready for a potential attack on your hand from a territorial fish or in the case of reef live rock, the sting of an urchin or fire worm lurking within the rock.

Gloves are highly recommended particularly if you will be handling a large number of rocks.

The substrate is best cleaned by using a readily available gravel cleaning device. The simplest of these consist of a clear plastic cylinder opened on one end and attached to a vinyl hose on the other end. Find one that is designed to work with your particular substrate particle size and depth. The key is to vacuum each point of insertion until the water running through the substrate (as visible through the plastic cylinder) is clear and only substrate matter remains in the tank. If you haven't used a gravel vacuum before it might take some practice to get the best technique down particularly with some of the finer marine sands.

Clean Up Method #2:

The alternative method for cleaning your substrate involves the use of bacterial additives designed to consume the very detritus and organic matter we are trying to remove from the substrate. Note that not all of these products are created equal and some are no more effective than distilled water. Because of this unfortunate potential, I will outline for you the things to look for in this product category.

Purchase a product specifically designed for your type of aquarium, usually either a freshwater or saltwater formulation. Do not purchase a product that does not list an expiration date on the packaging but also try to determine if the product has been transported and stored within the manufacturer's recommended environmental conditions.

Look for a bacterial product specifically designed to clean (breakdown) sludge and organic buildup. Products designed to "seed" a new aquarium with nitrifying bacteria are not the desired supplement.

Look for clear and precise instructions on the use of the product being careful to follow those instructions accurately. A danger with this type of bacterial product is an oxygen-depleting bacterial bloom

which could have deadly effects on your tank's inhabitants so care should be exercised in order to avoid overdosing.

Consult some of your favorite forums and ask around your local fish store and fish club for product testimonials and recommendations. I have personally had good results using Dr. Tim's Aquatics Waste-Away but I'm sure there are other fine products available which I have yet to try for myself.

Plan on maintaining the "Action" steps in the article for at least one month at which point you can evaluate the effectiveness of your actions and tweak your continued course of action.

I hope you'll find some if not all of these steps useful to your goal of restoring your aquarium to its glory days and that you'll use the lessons learned from this article to your continued success in our wonderful hobby. I'm a big proponent of learning and sharing and I welcome any comments you might have to contribute on the articles subject matter.



With time and effort, you can turn back the tide and once again enjoy the fruits of a well balanced aquarium. From here on, preventative maintenance will keep your aquarium looking its best and your stock healthy and happy.

ABOUT THE AUTHOR

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Raul Roman BSc. has over 20 yrs. experience in the saltwater aquarium hobby ranging from hobbyist to owner and operator of a coral propagation business. Raul's current involvement in the hobby is as an article contributor to some of the aquarium hobby's finest publications, as the president of the Marion Ocala Reef Enthusiasts fish club, and the caretaker of his 150 gallon garden eel dominated reef aquarium. Raul can be reached at raulroman@me.com for comments or questions.



Community Directory

INTERNATIONAL

Advanced Aquarist

Salty Tank

American Livebearer Association

USA Fish Box

<http://www.advancedaquarist.com>
<http://www.saltytank.com>
<http://livebearers.org/>
<http://usafishbox.forumotion.com/>

CANADA

Betta Breeders Canada

Alberta

Calgary Aquarium Society

Edmonton Aquarium Club

British Columbia

Vancouver Aquatic Hobbyist Society

Wet Coast Aquarium Society

Ontario

Brampton Aquarium Club

Peel Aquarium Club

Brant Aquarium Society

Chatham-Kent Aquarium Society

St Catharines & Area Aquarium Soc.

Durham Region Aquarium Society

Ottawa Valley Aquarium Society

Hamilton & District Aquarium Society

Forest City Pond Club

Kitchener/Waterloo Aquarium Society

London Aquarium Society

Sarnia Aquarium Society

Toronto Willowdale Aquarium Society

Manitoba

Aquarium Society of Winnipeg

Nova Scotia

East Coast Aquarium Society

Saskatchewan

Saskatoon Aquarium Society

Regina Aquarium Society

Quebec

Montreal Aquarium Society

La Societe des Aquariophilie de Montreal

Ass. Reg. des Aquariophiles de Quebec

<http://www.bettabreederscanada.com/>

<http://www.calgaryaquariumsociety.com/>
<http://www.fish-club.org/>

<http://vahs.ca/>
<http://wetcoastaquariumsociety.ca/wetcoast/>

<http://www.bac-on.org/>
<http://www.peelaquariumclub.org/>
<http://www.brantaquariumsociety.ca/>
<http://www.cichlidae.com/forum/viewforum.php?f=103>
<http://www.scaas.info/index.html>
<http://www.dras.ca/>
<http://ovas.ca/>
<http://www3.sympatico.ca/ps.mcfarlane/home.htm>
<http://www.freewebs.com/fcpc/>
<http://www.kwas.ca/>
<http://www.londonaquariassociety.com/>
<http://www.geocities.com/sarniaaquariumsociety/>
<http://www.torontoaquarium.org/>

<http://www.asw.ca/>

<http://www.eastcoastaquariumsociety.ca/forum/>

<http://www.saskatoonaquarium.com/>
<http://www.reginaaquariumsociety.ca/>

<http://www.geocities.com/mtlfishclub/index.html>
<http://www.aquasam.qc.ca/>
<http://www.oricom.ca/pierdes/>

UNITED STATES OF AMERICA

Alaska

Juneau Aquarium Society

Arizona

Dry Wash Aquarium Society

California

Bakersfield Koi & Water garden Society

Desert Fish Club

Sacramento Aquarium Society

San Francisco Aquarium Society

Silicon Valley Aquarium Society

Santa Clara Valley Koi and Water Garden Club

San Diego Tropical Fish Society

Pacific Coast Cichlid Association

Colorado

Southern Colorado Aquarium Society

Colorado Aquarium Society

Rocky Mountain Cichlid Association

Connecticut

Aqua-Land Aquatic Society

Exotic Fish Society of Hartford Inc.

Norwalk Aquarium Society

Florida

Gold Coast Aquarium Society South Florida

Tampa Bay Aquarium Society

Georgia

Atlanta Area Aquarium Society

Hawaii

Honolulu Aquarium Society

<http://www.taursys.com/kasha/JAS/>

<http://www.drywashaquarium.org/>

<http://www.bakersfieldkoiclub.com/>
<http://www.desertfishclub.com>
<http://www.sacramentoaquariumsociety.org/>
<http://www.sfaquarium.org/>
<http://www.tactics.com/d/svas/>
<http://www.sckoi.com/>
<http://www.geocities.com/sandiegofishfan/>
<http://www.cichlidworld.com/>

<http://www.southerncoloradoaquariumsociety.com/>
<http://www.coloradoaquarium.org>
<http://www.liss.olm.net/rmca/>

<http://pages.cthome.net/vito/>
<http://users.rcn.com/wmercer/>
<http://www.castaways56.supanet.com/>

<http://www.gcassf.org/Home.htm>

<http://www.tbas1.com/>

<http://atlantaaquarium.com/>

<http://www.geocities.com/Heartland/Meadows/2948/HASF.html>

Illinois

Champaign Area Fish Exchange
Chicagoland Marine Aquarium Society
Planted Aquarium Club of Chicago
Tri-County Tropical Fish Society
Greater Chicago Cichlid Association
Rockford Reefers Aquarium Club

Indiana

Circle City Aquarium Club, Inc.
Indiana Marine Aquarium Society
Michiana Aquarium Society

Iowa

Eastern Iowa Aquarium Association
Iowa Aquarium Society
Greater Iowa Reef Society

Kentucky

Greater Louisville Koi & Goldfish Society
Louisville Marine Aquarium Society

Maine

Great Lakes Aquarium Society
Worcester Aquarium Society

Massachusetts

Boston Aquarium Society
Pioneer Valley Aquarium Society
Worcester Aquarium Society

Michigan

The Aquarium Society of Ann Arbor
Grand Valley Aquarium Club
Southwestern Michigan Aquarium Society
Motor City Aquarium Society
Greater Detroit Aquarium Society
Metro Detroit Aquarium Clubs
Upp. Peninsula of Michigan Marine Aq. Soc.
Marinelife Aquarium Society of Michigan

Minnesota

Minnesota Aquarium Society
Red River Valley Aquarium Club

Missouri

Missouri Aquarium Society
Heart of America Aquarium Society

New Hampshire

New Hampshire Aquarium Society

New Jersey

Jersey Shore Aquarium Society
North Jersey Aquarium Society

New York

Greater City Aquarium Society
Brooklyn Aquarium Society
Allegheny River Valley Aquarium Society
Long Island Aquarium Society
Central New York Aquarium Society
Nassau County Aquarium Society
Danbury Area Aquarium Society
Tropical Fish Club of Erie County

North Carolina

Raleigh Aquarium Society
Cape Fear Aquarium Society

Ohio

Stark County Aqua Life Enthusiasts
Greater Cincinnati Aquarium Society
Cleveland Aquarium Society
Ohio Cichlid Association
Greater Akron Aquarium Society
Medina County Aquarium Society
Youngstown Area Tropical Fish Society
Ashtabula County Aquarium Club
Lorain County Aquarium Society
Columbus Area Fish Enthusiasts

Oklahoma

Oklahoma Aquarium Association

<http://www.champaignfish.com/>
<http://www.cmas.net/>
<http://www.pacchicago.org/>
<http://aquariumhobbyist.com/tctfs/index.html>
<http://www.gcca.net>
<http://www.rockfordreefersaquariumclub.org/>

<http://www.circlecityaqclub.org>
<http://indmas.org>
<http://michianaaquariumsociety.org/>

<http://www.eiaainfo.org/>
<http://www.iowaquaaria.com/>
<http://www.greateriowareefsociety.org/>

<http://www.louisvillekoiclub.com/>
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<http://www.glaquarium.org/>
<http://www.petsforum.com/was/>

<http://www.bostonaquariumsociety.org/>
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<http://www.upmmas.com/>
<http://www.mas.m.org/>

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<http://www.kcfishclub.org/>

<http://www.nhaquariumsociety.com/index.htm>

<http://www.jerseyshoreas.org/>
<http://www.njas.net/>

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<http://www.liasonline.org>
<http://www.cnyas.org/>
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<http://northeastcouncil.org/daas/index.html>
<http://tfcec.tripod.com/tfcecwebsite/>

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<http://capefearaquariumsociety.com/>

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<http://www.gcas.org/>
<http://www.clevelandaquariumsociety.org>
<http://www.ohiocichlid.com/>
<http://www.gaas-fish.net>
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<http://www.yatfs.com/>
<http://www.geocities.com/Heartland/Park/6982/index.html>
<http://geocities.com/RainForest/Andes/3049/>
<http://www.columbusfishclub.org/>

<http://petsforum.com/okcaa/>

Oregon

Greater Portland Aquarium Society

Pennsylvania

Bucks County Aquarium Society

Pennsylvania (cont)

Delaware County Aquarium Society

International Betta Congress

Aquarium Club of Lancaster County

Northeast Philadelphia Aquarium Society

Greater Pittsburgh Aquarium Society, Inc.

Pittsburgh Marine Aquarium Society

Erie Aquarium Society

Rhode Island

Tropical Fish Society of Rhode Island

South Carolina

Myrtle Beach Aquarium Club

Tennessee

Putnam County Aquarium Society

West Tennessee Marine & Reef Aquarium Club

Texas

Federation of Texas Aquarium Societies

Capital Aquarium Society of Texas

Dallas/Ft. Worth Aquatic Plant Club

North Texas Water Garden Society

Utah

Great Salt Lake Aquarium Society

Wasatch Marine Aquarium Society

Vermont

Black River Aquarium Society

Virginia

Potamac Valley Aquarium Society

Washington

Bellingham Aquarium Society

Greater Seattle Aquarium Society

Kitsap Aquarium Society

Washington Koi and Water Garden Society

Wisconsin

Milwaukee Aquarium Society

Green Bay Aquarium Society

Central Wisconsin Aquarium Society

<http://www.gpas.org/>

<http://www.bcasonline.com/>

<http://www.dcas.us>

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<http://www.acl.us/>

<http://www.phillyfishclub.com/>

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<http://www.pmasi.org/frm/>

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<http://www.tfsri.org/>

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<http://www.gbasonline.org/gbashome.htm>

<http://www.cwas.org/>

PUERTO RICO

Asoci. de Acuaristas de Aguadilla

Acuarista Metro Este

<http://coqui.metro.inter.edu/acuaristas/aaa.html>

<http://www.amepr.org/>

BERMUDA

Bermuda Fry-Angle Aquarium Society

<http://www.fryangle.com/>

BRAZIL

Aquaflux Aquarismo e Aquapaisagismo

Aqualinea

<http://www.aquaflux.com.br>

<http://aqualinea.com.br/blog/>



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PUFFERS, PORCUPINES, BOX & COWFISH
IT'S HIP TO BE SQUARE



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